

REMARKS

Applicant thanks the examiner for the courtesy of the telephone interview on February 19, 2004. The following sets forth the issues discussed during the interview.

The examiner objected to the drawings as not showing every feature of the invention specified in the claims. During the interview the applicant submitted that the examiner's office action, on page 5, paragraph 2, acknowledges that the typical rotary screw air compressor shown in the figures and described in the specification includes interengaged compressor rotors. The examiner's supervisor agreed to such and the applicant agreed to show specifically the previously known rotors in Fig. 3. Fig. 3 is amended to incorporate the rotors 13, 15. Fig. 4 is amended to add the element number for the rotor 13 and to add element numbers 17 and 19. The applicant respectfully submits that no new matter is added, but instead submits that which is added merely shows graphically that which was already described in the specification and drawings.

The specification was amended to correspond to the drawing figures. Again, no new matter is added.

The examiner rejected claims 1-8 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The basis of the rejection was the inclusion of the first and second interengaged compressor rotors to claim 1. As applicant explained during the interview, the examiner acknowledges in the prior office action that the typical rotary screw air compressor shown in the figures and described in the specification includes interengaged compressor rotors. Again, the examiner's supervisor agreed to such and indicated that this rejection would be withdrawn.

The examiner rejected claim 2 under 35 U.S.C. §112, second paragraph. Applicant respectfully submits that this claim is moot as claim 2 has been canceled. Each of the remaining claims meets the requirements of 35 U.S.C. §112.

The examiner rejected claims 1 and 4-6 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,222,874 (Unnewehr et al.) in view U.S. Patent No. 5,217,359 (Kawahara et al.). As explained during the interview, applicant respectfully traverses such rejection.

The examiner acknowledges on page 4, first paragraph, that Unnewehr et al. fails to teach or suggest the drive shaft being supported by the compressor main body to provide cantilever support of the motor rotor. The examiner cites Kawahara et al. as overcoming such rejection and explained during the interview that Kawahara et al. uses the term cantilever-supported in col. 4, line 49, thereof. Applicant explained that the Kawahara et al. system is the same as, and has the same deficiencies as, Unnewehr et al. Kawahara et al. describes, beginning at col. 4, line 44, that its system is a vertical system with the oil flowing downward through the system. Just as in Unnewehr et al., the motor 3 is mounted above and supported on the compressor assembly 2. While the term cantilever is used, it does not teach or suggest the claimed structure of the present invention. It is respectfully submitted that the combination of Unnewehr et al. and Kawahara et al. fail to teach or suggest the claimed invention.

The examiner rejected claims 1-3 and 7-16 as being unpatentable over U.S. Patent No. 5,912,516 (Atkinson et al.) in view of the Applicant admitted prior art (AAPA). As explained during the interview, applicant respectfully traverses such rejection.

Independent claim 1 recites “the compressor comprises a main body supporting first and second interengaged compressor rotors; and a substantially horizontal drive shaft having first and second portions, wherein one of the first and second compressor rotors is mounted on the drive

shaft first portion and the motor rotor is mounted directly on the drive shaft second portion, the drive shaft first portion being vertically supported by the compressor main body and the drive shaft second portion is free of vertical support to provide cantilever support of the motor rotor.”

The examiner argues that Atkinson et al. teaches a compressor and motor assembly in which the motor stator is mounted directly to the drive shaft and that the drive shaft is mounted for cantilever support of the motor rotor. Applicant respectfully disagrees. In the only embodiment of Atkinson et al. including a compressor, that shown in Fig. 4, the motor rotor is not cantilever supported. Instead, the motor rotor is supported between the bearing 117 and the unnumbered sleeve between the motor rotor and the compressor blade 116. In the remaining embodiments, Atkinson et al. does not teach a compressor at all, but instead teaches a turbine that is turned by incoming air to turn the small motor rotor at high speeds, such as over 100,000 rpm (see col. 1, line 26) such that the rotor is part of a generator. Atkinson et al. fails to teach or suggest cantilever support of a motor rotor from the shaft of a compressor.

Furthermore, Atkinson et al. does not teach or suggest providing cantilever support from a shaft extending from one of the interengaged rotors of a rotary screw compressor. The examiner argues that the AAPA teaches that rotary screw compressors are known. However, the fact that individual components of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness. Atkinson et al. is primarily concerned with power generation and only teaches utilizing a small, high speed motor/generator. There is no motivation or suggestion to combine a rotary screw compressor with that of Atkinson et al., particularly because the small motor/generator of Atkinson et al. would not be capable of generating sufficient power to operate a rotary screw compressor. If the permanent magnet

motor/generator of Atkinson et al. was made large enough to operate a rotary screw compressor, the motor stator would be too large and too heavy to cantilever mount the motor rotor.


Additionally, claims 3 and 10 each recite a rotary screw compressor and driving motor assembly wherein the driving motor is a hybrid permanent magnet motor providing an induction mode and a permanent magnet mode. The examiner sites the AAPA as teaching a hybrid permanent magnet motor is known. Again, the fact that individual components of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness. There is no teaching or suggestion to modify the motor disclosed in Atkinson et al. to a hybrid permanent magnet motor. Atkinson et al. is primarily concerned with power generation and only teaches utilizing a small, high speed motor/generator. There is no motivation to replace the high speed motor/generator with a hybrid permanent magnet mode. Such a modification to Atkinson et al. would be prior art unsatisfactory for its intended purpose. None of the cited references, alone or in any reasonable combination, teach or suggest the use of a hybrid permanent magnet motor to drive a screw compressor.

During the interview, the examiner's supervisor raised a question whether the specification supported the claimed hybrid permanent magnet motor providing both an induction mode and a permanent magnet mode. The original specification on page 4, lines 21-22, describes that the motor is a hybrid permanent magnet motor including both stator laminations 42 and stator coils 44, as shown in Fig. 44. As explained in the specification on page 2, beginning on line 10, in conjunction with the patents cited therein, it is known that the stator laminations and stator coils can both be used to produce magnetic flux to drive the motor rotor.

It is respectfully submitted that pending claims 1, 3-8, 10, 11 and 13-17 are in condition for allowance. Early reconsideration and allowance of the pending claims are respectfully requested.

If the examiner believes an interview, either telephonic or in person, will advance the prosecution of this matter, it is respectfully submitted that the examiner get in contact with the undersigned.

Respectfully submitted,



Glenn M. Massina
Reg. No. 40,081

Docket No.: 065424-9015-00
Michael Best & Friedrich LLP
3773 Corporate Parkway Suite 360
Center Valley, Pennsylvania 18034

610-798-2170